Space Weather Forecast

Issued on Thursday, 16 May 2024 at 12:22 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Current CME influence likely declining near term. Slight chance of further Strong class flares, mainly from a new region on the east limb. S1 Minor Solar Radiation Storm easing.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with a Strong flare observed peaking at 15/1438 UTC, from the southeast limb, associated with some portion of the new observed region rounding the southeast limb. Any further activity from AR3664 is now likely to be completely obscured as it has retreated onto the far-side around the southwest limb. There are thirteen sunspots on the disc, eleven of which are numbered. The main flare risk is now likely from the new region on the southeast limb, with further associated strong spots likely to rotate onto the visible disc during the next 12-24 hours. This may be comprised of one large region, or a closely connected collection of different regions, however this is currently too close to the limb to accurately analyse. The other sunspot regions are generally smaller, simpler and stable.

No Earth-directed Coronal Mass Ejections (CMEs) were identified in available imagery. A filament eruption (line of material ejected by the Sun) was observed around 15/0950 UTC from the northeast disc, however this has been assessed as likely missing Earth, passing north and behind.

Solar Wind / Geomagnetic Activity: A weak CME glance was observed at 15/1814 UTC. No notable speed change was observed however, with slightly elevated winds easing through much of the the period to around 430km/s. A second stronger CME arrival observed from 16/0430 UTC onwards, this from an uncertain source, with solar winds increasing slightly to 460-500km/s. Interplanetary Magnetic Field (IMF), Bt, was initially weak, but exhibited a small increase following the first CME glance and a further erratic increase to peak at strong levels following the second arrival, with values subsequently falling back to weak by the end of the period. The important north-south component Bz weakly negative for much of the period, became more strongly negative following the second CME arrival. Geomagnetic activity was Quiet to Unsettled (Kp1-3), but with a G2 Moderate geomagnetic storm interval recorded 16/0600-0900 UTC following the second CME arrival, and a G1 Minor geomagnetic storm interval 16/0900-1200UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently at S1/Minor Radiation storm due to the flare activity from the large complex sunspot (now over the southwest limb) during the last couple of days. This count rate is very gradually easing.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is now expected, with a slight chance of further Strong class flares. These mainly from the new region that is expected to rotate onto the southeast limb.

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However, there is perhaps a very slight chance of further flares being observed from the complex sunspot over the southwest limb during the first few hours. The regions currently on the visible disc are smaller and simpler, with isolated M-flares possible from these.

Solar Wind / Geomagnetic Activity: There is one CME currently in the forecast that may bring glancing influences. This is forecast to arrive later day 2 (17 May), but with low confidence. Otherwise solar winds are currently seeing continued CME influence from an uncertain source. This influence is expected to decline through day 1 (16 May) with winds expected to gradually ease towards background through the remainder of the period in the absence of further CME enhancement. Activity is expected to be mainly Quiet with Unsettled, but with spells of Unsettled to Active geomagnetic conditions likely both initially and from any further CME glances, with a slight chance of G1 Minor storm intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to continue above the S1 Minor Radiation storm threshold, but with a declining trend and falling below this level through days 1-2 (16-17 May). However further increases remain possible given the occurrence of any significant flares from the large and complex sunspot now rotated around the western limb, although with a decreasing likelihood.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	Yes	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	90	50	20	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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